We have the reports of a number of cases of the several forms of rheumatism just described, and also of cases where the causes which produce certain types of rheumatism caused either epileptic or paralytic diseases, and sometimes aberrations of mind, but the length to which this paper has already extended renders it necessary to postpone their publication.

In conclusion, I will merely state that these investigations were commenced in 1859. The classification and results, as here given, were first presented to the public in my lectures in Charity Hospital Medical College, in 1864, and a summary of my results were published in the No. of this Journal for April last.

ART. V.—*On Some Points Relating to Fractures of the Neck of the Femur.* By JOHN H. PACKARD, M. D., one of the Surgeons to the Episcopal Hospital, Phila.; Mütter Lecturer on Surgical Pathology, etc. (With eight wood-cuts.)

CERTAIN facts in regard to the surgical anatomy of the hip-joint, and of the upper part of the thigh bone, seem to me to have failed to find due appreciation from those who have hitherto written upon this subject; by some they are scarcely mentioned, by others not at all. And although, perhaps, most surgeons could, if asked to do so, state clearly and promptly their creed in regard to the fractures occurring in this region, and give high authority in support of it, I hope to show in the following pages that the matter may still be not unprofitably discussed.

It would take up too much time and space to review the opinions and statements of authors, nor shall I even quote them except incidentally, and when they are not likely to be within the reach of most of the readers of the *Journal*. Let me ask the indulgence of those who may be familiar with some of the facts or views herein presented.

Fractures of the cervix femoris are divided, as every student knows, into those which are altogether within the capsular envelope, those which are altogether outside of it, and those which are partly within and partly without. In cases of the first variety bony union is by some thought never to occur, while in those of the other two it is quite constant. By other surgeons exceptions to the rule of non-union in intracapsular fractures are strongly urged, while others still are simply willing to admit that such may possibly have been met with. This question need not be discussed just now.

Let us first define accurately the difference between extra and intracapsular fractures, and the rationale of their occurrence. And first, as to the extent of the cervix femoris which properly belongs to the joint. Without occupying time in quoting the statements of various anatomists, let us take at once what is revealed by the dissection of this part in well-developed adult subjects.

On laying bare the capsular ligament, properly so called, of the hip, we find that it extends from the edge of the cotyloid ligament (the fibro-cartilaginous ring which deepens the acetabulum) to the base of the neck of the bone; that is, to the root of each trochanter, and to the ridges which connect them in front and behind. Dividing this capsule by a cut lengthwise from its acetabular margin to its femoral attachment, we find it lined by a synovial membrane reflected from it to the neck of the bone. If now the reflection of the synovial membrane corresponded exactly to the attachment of the capsular ligament, the extent of the joint would, it is clear, embrace the whole neck of the femur. Such, however, is not the case. Upon careful study of fresh specimens we find that there is a portion of the neck at its root surrounded only by fibrous tissue, the outer layer of which is a part of the capsular ligament, while the deeper is the periosteum; these two layers being, of course, inseparable by dissection.

Generally, the distance between the reflection of the synovial membrane and the intertrochanteric lines is about half an inch; one or two pockets, however, existing, where the joint cavity is somewhat prolonged outwards. One of these pockets is usually just within the gemelli muscles in the digital fossa, behind the greater trochanter. Differences exist between different individuals in regard to the precise relative extent of the synovial membrane and the neck of the bone. But I have in no case found the true joint-cavity within less than one-half an inch of the base of the lesser trochanter in an adult.

I think, but am not prepared to assert positively, that in subjects whose cervix femoris is long, and set on at an obtuse angle with the shaft, this distance is greater than in those in whom the angle between the neck and shaft is more acute, and the neck shorter.

What has now been said seems to me to justify the drawing of a distinction between fractures of the cervix femoris within the joint and those which are simply within the capsular ligament. The force of this distinction will be at once apparent.

In regard to the immediate investment of the neck of the thigh bone (called by Amesbury, the "close coverings"), an arrangement exists which is mentioned by very few anatomists, and not by them with a full appreciation of its importance. Under this portion of the synovial membrane are often to be noticed, raising it into longitudinal folds, strong ligamentous bands,[1] like ridges. Once, in a fresh joint taken from a subject at the Philadelphia Almshouse, I saw a vessel of some size running along one of these folds. Another subject, a woman, examined by me at Dr. Keen's anatomical rooms, had in each hip-joint three such folds, running obliquely (spirally) from left to right in that of the left, and from right to left in that of the right side; she had, besides these, the longitudinal bands above described. Comparing with this the hip-joints of another subject, a male, with well-marked bones (the neck of the femur was much shorter than in the other case), I found but one such fold, and that not a very strong one.

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[1] Called by Weitbrecht "retinacula." Harrison, in the Dublin Dissector, and Todd, in the Cycl. of Anat. and Physiology, art. Hip-Joint, also notice these.

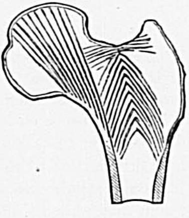
When these folds exist they must obviously exert an influence in diminishing the liability to fracture of the neck, and, in the event of such fracture, would, unless themselves broken across, tend to prevent displacement. Furthermore, if, as in the case before mentioned, they bear vessels, these would be of importance in the nutrition of the pelvic fragment; a nutrition which is constantly impaired when these accidents occur.

Upon dissecting some fresh hip-joints, we cannot but be struck with the great vascularity of the ligamentum teres, as compared with that of other fibrous structures; and it seems as if its object must be the nourishment of the head of the femur. Amesbury, although he represents this very well in several cuts, says that these vessels "are so extremely minute that we cannot suppose that the head of the bone derives any considerable portion of its nourishment from this source." But when, in intra-capsular fractures, the close coverings of the neck are torn through, no other vascular connection exists between the pelvic fragment and the rest of the body, so that whatever blood the former gets must be through this channel.

I believe that this vascularity is diminished very much after middle life; such has been the case, at least, in a number of old subjects examined by me, nor have I either notes or any recollection of a single instance to the contrary. It is probable that the supply of blood from other sources to the head and neck of the bone is likewise lessened in old age, as the atrophy natural to that period of life progresses.

A careful examination of vertical sections of the head and neck of the femur shows, as several writers have pointed out, that a number of the cancellous columns, beginning at the upper end of the inner wall of the shaft of the bone, diverge upwards to the concavity of the thin articular lamella of compact substances of the head so as to receive the weight of the body upon their extremities. (Fig. 1.)

Fig. 1.



Another series of columns are found to run up outwards from the same point, and from a line running upwards from it, to meet other columns running up inwards from the outer wall of the shaft; and these two sets of columns form a series of groined arches culminating at the upper wall of the neck of the bone, a little to the inner side of the greater trochanter (Fig. 1). By this arrangement the shifting of the weight towards the outer or upper portion of the head of the bone is provided for, the pressure coming in greater degree on the outer wall of the shaft, the inner wall, however, receiving its share through the inner columns of the arches.

The remainder of the cancelli run in various directions, not capriciously or at random, but so as to afford in the aggregate a very strong support to the solid wall of the bone. Sometimes it may be clearly seen that they are so placed as to run as nearly as possible in the line of muscular traction; an arrangement the mechanical advantage of which must be at once evident.

On comparing femora from different skeletons we find, as is well known, that the angle at which the neck is set on to the shaft varies very much. Sometimes, and especially in old persons, it is not much more than 90°. Ward states it to be on an average about 125°. And here I desire to suggest what I believe to be a fact, that such variations in the angle between the cervix and the shaft of the bone involve variations in the before-mentioned arrangement of the cancelli. When the angle is more acute, the weight of the body falls more on the outer portion of the head of the bone, and hence is distributed to the walls of the shaft through the groined arches above spoken of. The effect of this is, sometimes, that the starting point of the set of diverging cancellous columns first described is further upwards and inwards on the inferior wall of the cervix (Fig. 2). Some specimens, again, exhibit scarcely any arrangement of this kind, the cancelli being massed in the groined arches, and the neck consisting of a reticulation of bony tissue whose fibres have merely a general direction towards the compact substance covering in the head (Fig. 3).

Fig. 2.

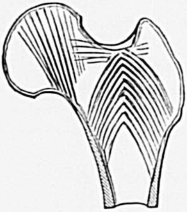
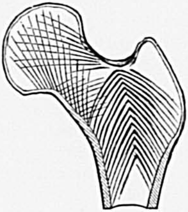


Fig. 3.

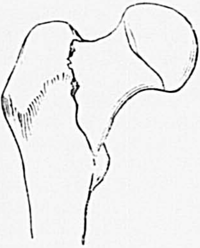


Now it must be obvious that in the first of the two conditions just described (Fig. 2), the cervix would be apt to give way at a point nearer the head than in that which usually obtains; while, in the second (Fig. 3), a transverse fracture close to the margin of the head might occur far more readily than when the diverging columns were well developed. If, therefore, the statement already made as to the arrangement of those diverging columns be correct, it will be seen why in some cases a fracture entirely within the joint-cavity takes place, the bone yielding above the reflection of the synovial membrane, while in other cases this could not occur, because the weakest portion of the cervix begins just above and in front of the trochanter minor, and runs upwards towards the upper wall somewhere nearer the crown of the head of the bone.

This idea finds support in the fact that, in a number of extra-capsular fractures examined by me (over twenty), and in all the illustrations of them given by authors, *the pelvic fragment has a long point embracing the portion of the lower wall of the cervix just alluded to.*

The annexed woodcut (Fig. 4), representing a specimen in the Museum of the Jefferson College in this city, illustrates this idea in its simplest form.

Fig. 4.



Now, in many extra-capsular fractures of the cervix femoris, the trochanter major is broken off. Prof. R. W. Smith, of Dublin, lays it down as the result of his experience that "it never happens that the neck of the femur is broken external to the capsule, without injury to the trochanter." But in three specimens examined by me this complication was wanting. Sometimes other lines of fracture run in other directions, splitting these main fragments into smaller ones, the lesser trochanter being also occasionally separated. By what rationale are these lesions to be explained? Some of them are so irregular as apparently to come under no general rule; but a careful scrutiny will always show that the arrangement of the cancelli influences the extent and direction of the breakage.

From the specimens which I have been able to obtain for examination, I am led to think that most usually the so-called extra-capsular fracture skirts the edge of the articular cavity, that part of the bone yielding which is covered by the band of capsular ligament between the reflection of the synovial membrane and the trochanters and intertrochanteric lines. When the fibrous tissues are preserved in preparing dried specimens, they are apt to shrink, so that fractures probably altogether within the capsule might readily be supposed to be partly outside of it.

By many standard writers on anatomy as well as on surgery, the statement is made without qualification that a lessening of the angle between the neck and shaft of the femur is a constant phenomenon of advancing age. And yet the doubt—first suggested, I believe, by Gulliver in the *Edinburgh Med. and Surg. Journal* for 1836—as to the correctness of this view, may be readily shown to be well founded by the study of specimens. The result of such study is that the bones of neither the old nor the young present any uniform character in this respect; in some skeletons of persons 70 or 80 years of age, the cervix is set on at a very obtuse angle with the shaft, while in some not older than 25 it does not exceed 110° or 120°.

Let it be clearly understood that I do not deny that this change may occur in some subjects in advanced years, as one of the phenomena of old age. Such a statement would, in fact, be difficult either to prove or to disprove, since no one bone can be watched during the period assigned to the process. All that we can say is that many old persons present the more obtuse angle, and many young persons the less, between the shaft and the head of the femur.

Now it will be at once asked, why, then, are the old so much more liable to fracture of the neck of this bone near its head than the young? Simply because of the diminished strength of the bony texture in the former. Many very old persons have undoubted extra-capsular fractures of this part, because the shape and structure of the bone are such as to prevent its giving way near its head. A typical specimen of this kind, taken by me in 1856 from a man named Lewis, æt. 74 years, is now in the museum of the Pennsylvania Hospital.

According to my own observations, whenever young femora present an acute angle (say from 110° to 115°) between the neck and shaft, they have also a texture so strong, and are so thick and firm, as to resist any force which can be brought to bear upon them. Possibly cases may occur in which the condition of old age is more nearly imitated, and then an intracapsular fracture might take place; but I have never met with such a bone.

After all that has now been said, it seems hardly necessary,to state formally that the point I seek to maintain is that, in some cases, the femur being at its upper part of a certain shape, the change in texture which takes place in the neck of the bone after the age of 50 years, combines with the existing mechanical arrangement to render the cervix liable to become fractured transversely, or nearly so, close to the head. This change in texture—and perhaps in consequence of it an exaggeration of the rectangular position of the cervix—is very common in the old. It may, like the arcus senilis, or like ossification of the costal cartilages, be absent; or it may, like these changes, be met with at a much earlier period of life. Still, it belongs among senile degenerations, and has a direct bearing upon the liability of the old to fractures of the cervix femoris within the capsular ligament.

The rationale of the production of fractures of the cervix femoris, so far as known, seems to me to bear out these theoretical views.

As to extra-capsular fractures, or those which affect the bone either wholly or partly outside of the synovial membrane, the causes may be divided into two classes: (*a*), falls on the feet or knees, the weight of the body coming on the head of the femur, or the converse—violence applied to the thigh (whether directly or through the leg), forcing the femur upward against the acetabulum; (*b*), falls, blows, or other forces coming against the greater trochanter and driving it inwards against the pelvis.

In the first of these two classes, the femur may be looked upon as a bent lever, acted on at a great disadvantage by two forces tending to increase its angle, or we may regard the neck and upper part of the shaft as representing an obtusely pointed arch, whose abutments are driven together. It yields first at its weakest point, where, namely, the bony matter is massed together at the apex of the fasciculus of diverging columns running up to the head; and this point may be, as stated in a previous page, just above and in front of the lesser trochanter, or further upward and inward towards the head. From this point the breakage runs more or less irregularly upwards across the axis of the cervix. The violence may end here, or the fragment thus made may be tilted up and driven outwards, perhaps by the patient falling upon the side, splitting away the groined arches at the base of the greater trochanter.

When the force acts against the greater trochanter from without, the bone gives way in like manner, its angle being increased, but the lower fragment is driven inwards against the upper, so as to produce the same splitting up of the trochanter as in the case first supposed. As a general rule, I believe, the character of the injury to the soft parts is such as to bear out these statements; the fibrous investment giving way completely above and in front of the neck, while below, and at the outer side of the bone, a part of it may remain unbroken.

Secondly, as to intra-capsular or intra-articular fractures—such as affect that portion of the bone surrounded by the synovial membrane. These need not be directly transverse, but are apt to be much less oblique than are the majority of extra-capsular fractures commonly so called. Moreover, by reason of the arrangement as well as of the condition of the bony texture, they are in general less deeply serrated.

Any two forces, one driving the trochanteric part of the bone upwards, forwards, or backwards, while the other sends its head in the opposite direction, may produce intra-capsular fracture in bones of the shape before described as liable to this form of injury, especially if the person be old, and the nutrition of the bone impaired. Types of this kind of violence are well-known; slipping off a curb-stone, twisting the foot outwards, a fall on the back of the trochanter. Such forces could not produce fracture in bones whose cancelli have the arrangement shown in Fig. 1; they might do so in such as are represented in Fig. 2, and in Fig. 3 a structure is depicted which would easily yield, especially when the nutrition is defective.

With regard to intra-capsular fracture of the cervix femoris, the most important question, and the one which has been most discussed, is as to the possibility of its becoming united by bone. All doubt in the matter would be set at rest at once by the production of a single bone in which such union could be demonstrated to have occurred. And many surgeons have thought that this character could fairly be claimed for certain specimens. R. W. Smith mentions seven of these, which he considers as deciding the question affirmatively; they will be again referred to. Dupuytren goes so far as to say—

> "Several anatomical preparations of intra-capsular fractures of the cervix femoris, well united, are to be seen scattered through the different museums of anatomy. Those which the shelves of the faculty of Paris and of the Hôtel Dieu contain, prove the reality of bony union, with or without deformity, beyond question. The ossific deposit in these specimens is often very regular, presenting itself sometimes in the form of connecting bridges, extending splintwise from one fragment to the other. It seems probable that Sir Astley Cooper had only seen fractures of the neck of the femur which had not been cured, or which had been badly treated, or altogether neglected."

Sir Astley Cooper does not deny the possibility of bony union, and, indeed, admits that he has met with one case[1] among the many examined by him.

Hamilton, the leading American authority, says "we have never yet seen a specimen which, upon a careful examination, proved satisfactory;" but he expressly disclaims anything like denial of the possibility of bony union under certain circumstances. It would scarcely, however, be worth while for me to quote the views of various surgical writers on the subject, since they are so easily accessible in standard works.

My object at present is to offer a different explanation, of which all the specimens and representations, to which I have yet had access, seem to me to be fairly susceptible.

This is, that in the cases in question *the fracture has been extra-capsular, or partly so, and has become firmly united by bone; after which a gradual absorption of the pelvic fragment has taken place, so as to bring the head close down to the trochanters.*

The grounds upon which I base this view are, in the first place, the fact that wherever sections of these specimens are made, the line of fracture, or at least the apparent line of union, begins just above the lesser trochanter, at the point where the cancellous columns start to diverge upwards to the head of the bone—the point always included in the pelvic fragment in cases of extra-capsular fracture. Secondly, the fact that in very many of the specimens of intra-capsular fracture with ligamentous union, where no pressure has been brought to bear on the femoral fragment, the neck is not absorbed; for which we may account by the continued supply of nourishment to this part. Such, then, ought surely to be the case in some, at least, of the specimens in which it is claimed that bony union has occurred. Thirdly, the fact that where the histories of these specimens are obtainable, it will be observed that the cases were *not* those in which circumstances would seem to have specially favoured bony union.

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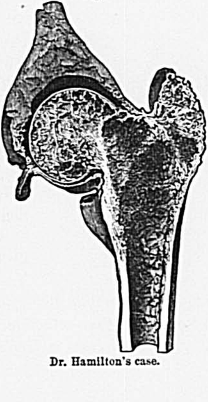
[1] Treatise on Dislocations and Fractures of the Joints, p. 137, London, 1842.

I am aware that those who, with Prof. R. W. Smith, hold that the trochanter major is always broken in cases of extra-capsular fracture of the cervix, will find in this an argument against the view now advanced. But perhaps it is in the very cases in which the trochanter is not broken (and that this may be is proved by three cases out of twenty within my own observation) that such absorption of the cervix takes place, and the head is brought close down to the upper end of the shaft.

I offer this theory only after a very careful examination of all the statements of cases, with or without representations of the specimens, both by American and foreign writers, in which bony union of intra-capsular fractures has been claimed to exist. Of these there are, so far as I can find, thirty-eight; fourteen in this country and twenty-four abroad. From this number may be subtracted three, very briefly and vaguely said by Dr. Robert Hamilton to have been shown to him by Prof. Tilanus, in Amsterdam. On similar grounds we may leave out, as not described, one said by Chelius to belong to himself, and another to Sœmmerring. Still another, exhibited by Dr. Snow Harris to the British Medical Association, in Dublin, in 1836, was admitted even by himself to be an example of chronic rheumatic arthritis, and not fracture at all; so that it may be set aside. We have then for analysis eighteen foreign cases.

Hamilton mentions thirteen specimens claimed to be of this character by surgeons in our own country. One case has escaped his notice, published in the *American Journal* for January, 1847, by Dr. Geddings, of Charleston, S. C.; thus making fourteen. Three of these are merely mentioned, and cannot be discussed; two are confessedly open to great doubt; and in one specimen, without history, in the Wistar and Horner Museum at the University of Pennsylvania, the bone has been found on section to be simply changed in shape, and not fractured at all. Hence we have left only eight which can be regarded with any positiveness. One of these is in Dr. Hamilton's possession, and he says that it is "of no inconsiderable pretensions;" but from the general tenor of his remarks on the subject, and from the manner in which he afterwards speaks of this particular specimen, it is evident that he does not regard it as altogether conclusive. Of this bone Fig. 5, taken from Dr. Hamilton's well-known and valuable work, represents a section. Another is in the Mütter Museum,

Fig. 5.

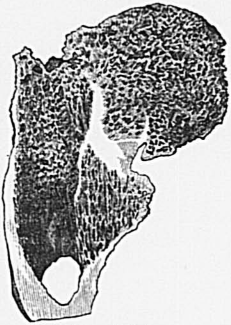


Dr. Hamilton's case.

and is found on section (not made until recently) to bear the general characters of the specimens we are now considering; in other words, there is no convincing proof of the original fracture having been within the limits of the synovial membrane.

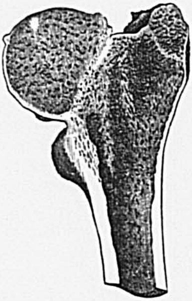
Of three of the remaining six united fractures, I am enabled to insert representations. Dr. R. D. Mussey, in a paper published in this Journal for April, 1857, gave detailed accounts of three cases in which he thought the patients had sustained fractures of the neck of the femur within the capsule; union by bone had taken place, as may be clearly seen in the wood-cuts (Figs. 6, 7, and 8) which accompanied his descriptions.

Fig. 6.



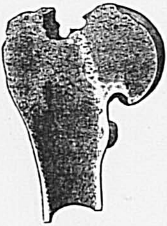
Dr. Mussey's first case.

Fig. 7.



Dr. Mussey's second case.

Fig. 8.



Dr. Mussey's third case.

Two other specimens have been represented by Prof. March, of Albany, in a paper read before the New York State Medical Society in 1858.

The case claimed by Dr. Geddings, of Charleston, is merely described.

Let us look for a moment at the specimens supposed to exist abroad. Of these (eighteen in all), thirteen are represented; those of Langstaff, Chorley, Adams, and Jones are given in R. W. Smith's work, before quoted; they will therefore be accessible to many readers of the Journal. Field's is depicted by Armstrong. Three others, Nos. 177, 188, and 189, in the Musée Dupuytren, are represented in the splendid lithographic plates of the catalogue raisonnée of that collection. Hodgson gives engravings, with descriptions, of three cases in *Guy's Hospital Reports* for 1851. Zeis, of Dresden, has represented and described two specimens, one in his own possession and one in the museum of the Medico-Chirurgical Society in Dresden. All of these correspond very closely to the specimens shown in the cuts of Dr. Mussey's cases, except the last (No. 189 in the Musée Dupuytren) where the trochanter minor has evidently been detached, and the fracture cannot, therefore, be, with any reason, called intra-capsular.

Of the other specimens, those, namely, of Swan, Brulatour, Stanley, Bryant, and Fawdington, we have descriptions merely. With one exception—Stanley's—they all seem to me, upon careful scrutiny, to bear the same explanation which I have proposed for the American cases.

Stanley's case is so remarkable as to merit further attention here. It occurred in a young man æt. 18, who fell from a loaded cart upon his right hip. There was no shortening or crepitus; the limb was bent to a right angle with the pelvis, and everted; abduction was difficult. Under the idea that the head of the femur was dislocated into the thyroid foramen, attempts at reduction were made, but without perceptible effect. He died of smallpox three months afterwards, and the bone, being removed, was placed in the museum of St. Bartholomew's Hospital, in the catalogue of which,[1] prepared by Stanley and revised by Paget, it is thus described:—

> "No. 50. Portion of a femur, exhibiting fracture of its neck. The plane of the fracture is vertical, extending from the upper margin of the head straight downwards through the neck to the outer part of its lower border. Bristles are introduced between the fractured surfaces, which are in close apposition, and it will be observed that the attachment of the capsule to the bone is entirely beyond the line of fracture. That portion of the neck of the bone which remained connected with the trochanters is partly absorbed, and the union of the fractured surfaces, although not complete, is by osseous matter inlaid between them."

Here, so far as the description goes, and it is a pity no representation of this specimen has ever been published, it would seem as if there had been in reality a fracture within the limits of the synovial membrane, but without rupture of the fibrous investment of the bone; under such circumstances, the fragments being held in absolute contact, and the vascular supply being maintained, bony union must be regarded as not only possible, but probable. It seems strange that the fibrous investments of the cervix should have withstood the force implied, although not expressly stated, to have been used in the attempts at reduction of a supposed dislocation.

This specimen is one of the three admitted by Malgaigne[2] as genuine examples of bony union of fractures within the joint; the others being Swan's, and one in the Musée Dupuytren (No. 188).

Swan's case is so readily accessible, being quoted in Dr. Hamilton's work, that it need not be repeated here. But as the other can only be found in the catalogue of the Musée Dupuytren, of which there are only two or three copies in this country, I may be excused for introducing a translation of the description as therein given:—

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[1] Vol. i. page 126.

[2] Traité des Fractures et des Luxations, tome i. p. 678; Translation, p. 545.

> "No. 188. Upper extremity of a fractured femur of the left side; specimen obtained from the Société Anatomique.
>
> "This bone is small, but presents a consistence, a thickness, and a texture altogether normal. The fracture is intracapsular, seated at the junction of the neck and head; the latter is carried downwards and backwards, so that (1) its upper part is on a level with the greater trochanter, and its lower is separated from the lesser by only about a centimètre ($\frac{1}{3}$ inch); (2) posteriorly there is a groove of only four or five millimètres ($\frac{1}{5}$ to $\frac{1}{6}$ inch) between it on the one hand, and on the other the posterior edge of the greater trochanter and the intertrochanteric ridge; (3) the anterior lip of the fractured surface, which belongs to the neck, is free, and forms an irregularly projecting crest, the presence and aspect of which leave no doubt of the existence of a fracture; (4) the posterior part of the neck and its lower angle are buried in the spongy tissue of the head; (5) lastly, the fractured surface of the head bears, below and behind, upon the compact wall of the neck. The two fragments seem to be united to one another, without other deformity than that due to the displacement mentioned. Some inequalities in the anterior face of the neck seem to be caused by the deposit of a small quantity of new bone. Posteriorly, along the intertrochanteric ridge, may be noticed also a small bony line, shaped like a crescent, its concavity turned inwards towards the head. These are the only traces of consolidation at the surface of the bone.
>
> "A double vertical section of this specimen shows a continuity so complete between the fragments that it seems as though no fracture had existed. Still one can make out clearly a white shining line of compact tissue, continuous with the compact wall of the shaft, and running up to the middle of the cellular texture of the head; now this compact line is nothing else than the neck of the femur, driven, as before explained, into the middle of the head, which forms, as it were, a cap for the outer fragment. Besides, the cellular texture of the head and neck is condensed, and exhibits a sort of hypertrophy not common to it, and which indicates a special process in the two fragments.
>
> "We regard this specimen as an incontestable proof of the possibility of a complete cure of intracapsular fracture of the neck of the femur, and are persuaded that all who examine it with care will be of the same opinion."

Notwithstanding the great authority of MM. Lacroix and Denonvilliers, by whom the catalogue of the Musée Dupuytren was prepared, and the indorsement of M. Malgaigne, I cannot, from the study of this description and of the corresponding plate in the atlas, feel satisfied that the fracture here was wholly within the capsule.

The existence of a specimen in which no absorption of the fragments should have taken place, but a distinct line of solid bony deposit should firmly join them, after maceration and section, would be the only positive proof of the possibility of this kind of union in intracapsular fractures of the cervix. Such a specimen has never yet, within my knowledge, been ascertained to exist. In concluding this paper, already too long, let me quote the very practical remarks of Maclise:—[1]

> "I must for my own part acknowledge that, in the anatomical condition of the bone when entire, I cannot discern any structural difference between the intra and extracapsular parts; nor can I conceive why (physiologically or pathologically), the fragments within the capsule should not unite by bone, while the fragments immediately outside the capsule should, while it is obvious that in both cases the upper fragment is put equally beyond the pale of a normal amount of vascular supply. It would seem, from what I can understand in canvassing the opinions of authors, that the circle of attachment of the capsular ligament to the base of the neck of the femur is as a barrier set between the intra and extracapsular parts—between the possibility and impossibility of osseous union taking place (?), but though the facts may appear in accordance with such doctrine, it is nevertheless true (*apparere non facit esse*) that facts may be misinterpreted and presented to our notice in a state as little conducive to the cause of truth as if they had never been recorded. If the fracture within the capsule physiologically defies osseous union, while the fracture external to it may unite by bone, then it should follow from these facts that, in the case of fracture through the axis of the upper part of the femur, from the head to the great trochanter inclusive, only a half union (extracapsular) can take place between the fragments, but I have in my researches seen such a fracture completely united by bone; and this, as a fact, is sufficient to persuade me that, not to the supposed difference in the condition of the fragments within and without the capsule, but to our inability to effect nice coaptation, and to secure immobility, are to be ascribed the many failures in promoting osseous union."

In the hope that some readers of this paper may be enough interested in the views therein stated, as to intracapsular fractures, to test them by reference to the published accounts, the following list of these, in order of time, is appended:—

Foreign.—Swan: one specimen, fully described. On Diseases of Nerves, etc., p. 304, 1820. Quoted by Prof. R. W. Smith.

Langstaff: one specimen, described and illustrated. Med.-Chir. Trans., vol. xiii., 1827; quoted also in Amesbury's work on Fractures, etc., and by Prof. R. W. Smith.

Brulatour: one specimen described. References the same.

Chorley: one specimen described and represented in Amesbury's work, and by Smith.

Field: one specimen. Reference same as last.

Stanley: one specimen, described in Med.-Chir. Trans., vol. xviii., 1833; quoted by Prof. Smith.

Fawdington: one specimen, described in London Med. Gaz., 1834; quoted in Amer. Journal, vol. xv. p. 534.

Harris: one specimen, described in Dublin Journal, 1835; quoted in Amer. Journal, vol. xviii. p. 246.

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[1] On Fractures and Dislocations; Commentary on Plate XXVIII.

Adams: one specimen, described and represented in Cyclop. of Anat. and Physiol., art. Hip-Joint; also in R. W. Smith "On Fractures," etc., p. 59.

Jones: one specimen, described and represented in Med.-Chir. Trans., vol. xxiv., 1841; also in R. W. Smith's work, p. 62.

Musée Dupuytren: three specimens, described in Catalogue raisonnée (1842), and represented in the Atlas of the same.

R. Hamilton: three specimens, merely mentioned, London Med. Gaz., 1843; quoted in Amer. Journal, vol. xxxi. p. 470.

Sœmmerring and Chelius: each one specimen, merely mentioned in Chelius' work, vol. i. p. 621 (American ed., 1847).

Hodgson: three specimens described and figured in Guy's Hospital Reports, vol. vii., 1851.

Bryant: one specimen, described in Brit. Med. Journal for 1857; quoted in Memphis Med. Recorder, 1857, p. 108.

Zeis: two specimens, described and represented, "Description of Two Specimens of Intra-Capsular Fracture and Union by Callus," Dresden, 1864.

American.—Geddings: one specimen, described in the Amer. Journal of the Med. Sciences, April, 1847.

Mussey: three specimens, fully described and represented in Amer. Journal for April, 1857.

Parker: one specimen, described by Johnson, New York Med. Journ., 3d series, vol. ii.; quoted by Hamilton.

March: two specimens, fully described and represented. Trans. of New York State Medical Society for 1858; quoted by Hamilton.

Colby: one specimen, described by Hamilton, *op. cit.*, p. 371.

Hamilton: one specimen, described and represented *op. cit.*, p. 372.

Pope: one specimen, merely mentioned by Hamilton.

Mütter: " " " " " "

Webster: one " " " " "

H. H. Smith: two specimens, mentioned in Smith's Surgery, vol. i. p. 610; also quoted by Hamilton, with remarks by Johnson, p. 364.

Art. VI.—*On the Treatment of Remittent and Yellow Fevers.*

By J. D. Miller, M. D., Surgeon U. S. N.

I submit the following simple statement of facts which have come under my observation in relation to the treatment of remittent and yellow fevers:—

I joined the United States Frigate Colorado, then blockading the port of Mobile, about the 22d of August, 1863, and found a malignant fever existing on board, the first case of which made its appearance on the 10th of the same month, and had terminated fatally on the 16th with what was supposed to be "black vomit." Two days after I joined the ship the second death occurred, after five days' sickness. During the next ten days there were five deaths, after two, three, and four days' sickness—making